

Abstract Submitted  
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**A Switchable Wettability Surface for Condensation Heat Transfer Manipulation**<sup>1</sup> JONATHAN LUDWICKI, PAUL STEEN, Cornell University — The development of variable heat transfer devices is critical to enabling human exploration missions beyond low-Earth orbit (2015 NASA Technology Roadmaps). Here, we show the ability to manipulate condensation heat transfer performance via a surface with temperature-dependent wettability. Specifically, a nanostructured poly(N-isopropylacrylamide) surface was developed to switch the surface wettability between hydrophobicity and hydrophilicity via temperature stimulus. The hydrophobic surface conformation produces flooded dropwise condensation, which shows a two-times larger heat transfer coefficient versus filmwise condensation in the hydrophilic state. Such surfaces hold promise as a means to control heat transfer during flow condensation in spacecraft two-phase flow thermal control systems.

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